

Postoperative Epidural Analgesia Following Radical Retropubic Prostatectomy: Outcome Assessment

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Background and Objectives: We retrospectively examined the effects of epidural analgesia on patients undergoing radical retropubic prostatectomy (RRP).

Methods: Patients (203) underwent radical retropubic prostatectomy under either general or epidural anesthesia alone or a combined general epidural technique. Of those, 143 had an epidural catheter placed and underwent radical retropubic prostatectomy under general anesthesia followed by postoperative epidural analgesia (Group E+G). Twenty-eight patients had the operation under epidural anesthesia followed by epidural analgesia in the postoperative period (Group E). Thirty-two patients had general anesthesia for the operation and postoperative systemic analgesia (Group G).

Results: There were no significant differences between the groups with respect to age, height, weight, ASA status, or operation time. The length of postoperative hospital stay was significantly longer in the general anesthesia group patients as compared to the other two groups ($P < 0.05$). Intraoperative blood loss and blood replacement were significantly higher in the general anesthesia group ($P < 0.001$). There were no significant differences between the groups with respect to return of bowel function postoperatively, or incidence of complications.

Conclusions: Epidural anesthesia and analgesia following radical retropubic prostatectomy have demonstrated a number of beneficial effects. These include decreased blood loss and shorter hospital stay.

J. Surg. Oncol. 1998;67:117–120. © 1998 Wiley-Liss, Inc.

KEY WORDS: epidural; analgesia; radical retropubic prostatectomy; postoperative recovery

INTRODUCTION

The method of anesthesia and postoperative analgesia has been shown to affect the perioperative outcome of retropubic prostatectomy. Epidural anesthesia has been associated with decreased blood loss [1,2,3] and decreased incidence of deep venous thrombosis [4]. Postoperative analgesia by epidural route was found superior to intravenous patient-controlled analgesia with respect to pain control, although no significant differences were found with respect to side effect profile or duration of

hospital stay [5]. At our institution, the method of anesthesia and analgesia for retropubic prostatectomy has varied. Methods have included general anesthesia followed by postoperative systemic analgesia, or epidural

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Accepted 30 October 1997

anesthesia often combined with light general anesthesia followed by postoperative epidural analgesia. Retrospectively, we analyzed the records of these patients to determine if the method of anesthesia and postoperative analgesia would result in a difference in perioperative outcome.

MATERIALS AND METHODS

The records of 203 patients who underwent radical retropubic prostatectomy (RRP) at our institution between January 1988 and June 1993 were reviewed retrospectively. The patients were grouped into one of three categories according to intraoperative anesthetic: general anesthesia (G), combined light general and epidural (E+G), and epidural anesthesia (E). All surgical procedures were performed by one of two surgeons. Anesthetic technique was chosen at the discretion of the attending anesthesiologist. Patients in groups G and E+G were induced with sodium pentothal or propofol and a muscle relaxant. Maintenance of anesthesia consisted of isoflurane/nitrous oxide mixture, a neuromuscular blocking agent for muscle relaxation, and intraoperative opioids (morphine, fentanyl, or sufentanil). All epidural catheters were placed in the lumbar area. Patients in group E were sedated with intravenous fentanyl and midazolam. Patients in groups E and E+G were administered epidural bupivacaine either 0.25% or 0.5%. In those patients with epidural catheters (groups E and E+G), postoperative pain management was achieved with infusions of either opioids alone or in combination with dilute concentration of bupivacaine (0.0625% or 0.125%). Postoperative pain management of group G patients was accomplished by administration of intravenous patient controlled analgesia.

The following variables were recorded from the patient hospital record: patient demographics, intraoperative anesthetic management, intraoperative blood loss, times to recovery of bowel sounds, time to tolerate liquids or solids, and total postoperative hospital stay. The incidence of postoperative complications was also recorded. Opioids were converted to morphine equivalents (1 mg of morphine = 1/10 mg of alfentanil = 1/80 mg of fentanyl = 1/800 mg of sufentanil) and data were expressed in mg of morphine.

Data were analyzed using ANOVA, the Kruskal-Wallis test, and Pearson Chi-square test. The Tukey posthoc test was used to identify differences between means once statistical significance was established. Data were reported as mean \pm S.D. and a *P* value of < 0.05 was considered statistically significant.

RESULTS

A total of 203 patient charts were reviewed. Eleven patients were excluded from analysis because the epidural catheter was found to be nonfunctional in the periop-

TABLE I. Patient Demographic Data*

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Age (years)	64.4 \pm 5.4	66.2 \pm 3.7	65.6 \pm 5.9
Height (inches)	69.4 \pm 2.8	69.8 \pm 2.1	70.1 \pm 2.6
Weight (lbs)	181.3 \pm 25.3	183.1 \pm 22.3	180.3 \pm 28.6
Surgical time (minutes)	205.5 \pm 39.4	220.6 \pm 31.3	219.1 \pm 45.0
ASA Status ^a			
I	n = 8 (6%)	n = 0 (0%)	n = 1 (3%)
II	n = 96 (67%)	n = 16 (94%)	n = 24 (75%)
III	n = 39 (27%)	n = 1 (6%)	n = 7 (22%)

*Patient demographic data obtained from the hospital record. Values are presented as mean \pm S.D. (Standard Deviation) for age, height, weight, surgical time and percent of patients for ASA status.

^aASA, American Society of Anesthesiology.

TABLE II. Intraoperative Anesthetic†

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Morphine equivalents (mg)	29.0 \pm 25.0	6.0 \pm 6.0*	40.0 \pm 29.0
Potent agent (% of patients)	99.3	0*	100
>10 ml epidural bupivacaine (% of patients)	70	100	—

†Data were recorded from the patients' anesthesia record. Data are expressed as means \pm S.D. (Standard Deviation) for morphine equivalents. * = *P* < 0.0001 versus groups "E+G" and "G".

erative period. The remaining 192 patients were distributed among the three groups in the following way: group E+G = 143 cases; group E = 17 cases; and group G = 32 cases. There were no significant differences between the groups with respect to age, height, weight, duration of surgery, and ASA status (Table I). The intraoperative management of each group is shown in Table II. As expected, patients in group E received significantly less intraoperative intravenous IV morphine equivalents (5.9 \pm 6.2 mg) as compared to groups E+G and G (28.7 \pm 24.5 and 40.1 \pm 29.2 mg, respectively). In the E+G group, the epidural catheter was used as an adjunct to surgical anesthesia (defined as >50 mg of bupivacaine) in 70% of the cases. Postoperative epidural analgesia consisted of infusion of epidural opioids alone (79.4% of patients) or in combination with local anesthetic (20.6% of patients). Duration of postoperative epidural analgesia was 2.4 days \pm 0.9 days.

Perioperative blood loss (see Table III) was significantly higher (*P* < 0.001) in group G (3.8 \pm 2.2 L) compared to groups E+G and E (2.3 \pm 1.6 L, 2.9 \pm 2.4 L, respectively). Patients in group G also required more transfused blood than patients in groups E and E+G (5.0 \pm 3.0 L vs. 3.9 \pm 2.6 L and 2.8 \pm 2.1 L, respectively). There was no significant difference between the groups

TABLE III. Perioperative Blood Loss

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Donated blood (units)	3.3 ± 1.7	3.8 ± 1.5	2.7 ± 2.0
Transfused blood (units)	2.8 ± 2.1	3.9 ± 2.6	5.0 ± 3.0*
Total blood loss (liters)	2.3 ± 1.6	2.9 ± 2.4	3.8 ± 2.2*

Total blood loss and total number of blood units donated and received. Data were recorded from the patients' anesthesia record and the hospital blood bank record. Transfused blood includes both autologous and bank blood. Data are expressed as means ± S.D. (Standard Deviation). * = $P < 0.0001$ versus groups "E+G" and "E".

TABLE IV. Postoperative Hospital Stay

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Number of days	7.1 ± 1.7	7.0 ± 1.3	8.0 ± 2.2*

Length of hospital stay expressed as the number of days counted from the day of surgery until patient was discharged from the hospital. Data are expressed as mean ± S.D. * = $P < 0.05$ versus groups "E+G" and "E".

TABLE V. Postoperative Gastrointestinal Recovery (Days)

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Bowel sounds audible	1.7 ± 0.7	1.7 ± 0.5	1.7 ± 0.7
Tolerating fluids	2.6 ± 1.0	2.5 ± 1.5	2.9 ± 1.1
Tolerating solids	4.6 ± 1.2	4.3 ± 1.6	4.8 ± 1.2

Assessment of gastrointestinal recovery recorded from the patients' progress notes. Data are expressed as mean ± S.D. number of days. There were no significant differences between the groups.

in the number of autologous units of blood donated preoperatively. Postoperative hospital stay (see Table IV) was significantly shorter ($P = 0.04$) for patients in groups E+G and E (7.1 ± 1.7 and 7.0 ± 1.3 days, respectively) as compared to patients in Group G (8.0 ± 2.2 days). Postoperative gastrointestinal recovery was similar in all three groups (see Table V). Incidence of complications was also similar among the three groups (see Table VI).

In order to determine whether our results (blood loss and hospital stay) could have been influenced by some other changes over time (i.e., anesthetic practice, hospital discharge policy), a two-way multivariate 3×6 ANOVA was used to test for a treatment by time interaction using the factor of anesthetic technique (E + G, E, and G) and time (years 1988–1993). No significant interaction was found between anesthetic technique and time with respect to blood loss and length of hospital stay, (see Figs. 1 and 2). Therefore, other variables related to the time factor could not explain the differences among groups with respect to hospital stay and blood loss (Fig. 1). These results lend further support to the variable anes-

TABLE VI. Postoperative Complications

	Group "E+G" (n = 143)	Group "E" (n = 17)	Group "G" (n = 32)
Deep vein thrombosis	0 (0%)	0 (0%)	0 (0%)
Wound infections	4 (3%)	0 (0%)	0 (0%)
Atelectasis	10 (7%)	3 (18%)	3 (9%)
Bronchitis	2 (1%)	0 (0%)	1 (3%)
Pneumonia	3 (2%)	0 (0%)	2 (6%)
Nasogastric decompression	8 (6%)	2 (12%)	4 (13%)
Neurological complications	1 (<1%)	0 (0%)	0 (0%)
Other	0 (0%)	2 (12%)	0 (0%)
Total	28 (20%)	7 (41%)	10 (31%)

Incidence of postoperative complications in the 3 groups. Data are expressed as number of patients and percent of patients for each complication in each group.

Intraoperative Blood Loss During RRP

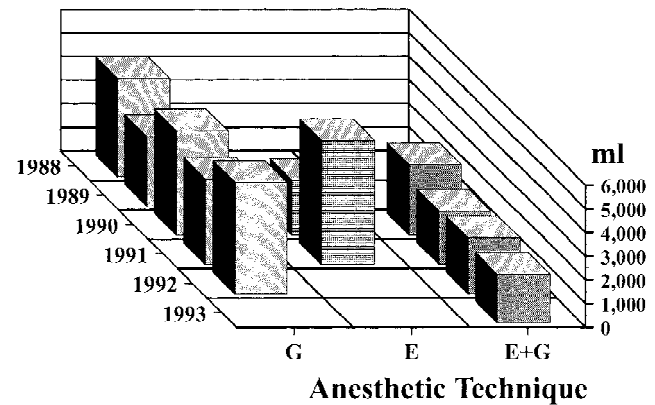


Fig. 1. Perioperative blood loss (ml) as a function of anesthetic technique over a 6-year period for each anesthetic group. Patients receiving general anesthesia alone (G), had a significantly increased blood loss ($P < 0.001$) compared to patients receiving epidural anesthesia alone (E), or general anesthesia combined with postoperative epidural analgesia, E+G.

thetic technique (G, E, and E + G) being the independent factor affecting blood loss and hospital stay.

DISCUSSION

Our results show that epidural anesthesia alone or in combination with general anesthesia is associated with decreased blood loss and blood transfusion requirement. This result is consistent with other studies [1,2,3] where epidural anesthesia alone was used. The addition of a light general anesthetic did not reverse this beneficial effect. Our data also support the use of epidural anesthesia and postoperative analgesia. This effect was present even when a general anesthetic was used in addition to the epidural. Allaire et al.[5] did not find a decrease in hospital stay associated with use of postoperative epidu-

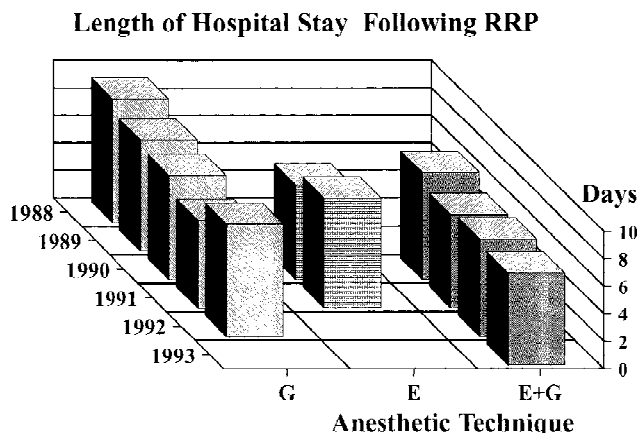


Fig. 2. Length of postoperative hospital stay (number of days post-surgery) as a function of anesthetic technique over a 6-year period. Patients receiving general anesthesia (G), experienced a longer postoperative hospital stay (1 day) compared to patients receiving epidural analgesia (E+G and E), $P < 0.05$.

ral analgesia. They presented data comparing only postoperative regimens since they could find no differences in outcome based on intraoperative anesthetic.

Similar to other studies [6,7], the use of epidural anesthesia and analgesia was not associated with any increase in complications. Our study also did not detect any alteration in return of bowel function associated with the use of epidural anesthesia and/or analgesia. There are conflicting data in the literature regarding the impact of epidurals or return of bowel function following surgery. Some studies have shown that the use of epidural morphine [8], but not bupivacaine [9], can inhibit bowel function. Brettmann [7] showed that continuous epidural analgesia after colonic surgery had a stimulating effect on peristalsis, whereas Ahn et al. [10] found a short period of intestinal paralysis. Our results do not support the notion that epidurals inhibit return of bowel function.

CONCLUSIONS

We conclude that the use of epidural anesthesia and postoperative analgesia alone, or in combination with a

general anesthetic, can provide significant advantages with respect to blood loss and duration of postoperative hospital stay. The development of a critical pathway for radical retropubic prostatectomy [11,12] has been shown to decrease hospital resource utilization and overall costs. The latter study [12] utilized epidural anesthesia and a single bolus of epidural morphine for postoperative analgesia. Our study supports the use of epidural anesthesia and postoperative analgesia in the critical care pathway.

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